Superfluidity in NS cores and heating in NS crusts: Constraints from the data on SXTs in quiescent states

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Transiently accreting neutron stars (NSs) remain hot during quiescent periods, due to deep crustal heating. X-rays from the hot NS surface can put constraints on many NS properties. We show that thermal emission from quiescent soft X-ray transients points at the presence of strong proton superfluidity and the absence of the mild neutron superfluidity in the outer NS core. The data also suggest that deep heat release in NS crusts (from nuclear transformations of the accreted matter) is about MeV per accreted nucleon.

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